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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES

In re patent of: Patent Application No.: 10/039,303

Charles F. Butler Art Unit: 3764

For: SIMULATED WAVE MASSAGE Filing Date: January 2, 2002

Examiner: Justine Romang Yu

APPLICANT'S APPEAL BRIEF

Real Party In Interest

The real party in interest is the individual named in the caption of the brief, namely, Charles F. Butler.

Related Appeals and Interferences

There are no other appeals or interferences known to the applicant or to the applicant's legal representative which will directly affect or be directly affected or have a bearing on the Board's decision in the pending appeal.

Status of Claims

All claims of the application, namely 1-8, stand finally rejected.

Status of Amendments

There will be an amendment filed subsequent to the final rejection and shortly after the filing of this brief to correct an obvious typing error in Claim 1.

Summary of the Invention

The invention of the subject appealed application relates to a method of applying vibrations to the human or animal body in which its sensed vibrational effect is wave like or

moving. In this manner the body is subjected to a therapeutic massaging effect. Referring to Figure 1 of the application, the applicant utilizes a wave generation device 14, such as described on pages 11 and 12 of the specification, which plays through a transducer 12 embedded within a chair 10. The frequency of the wave produced by the wave generator through the transducer is in the range between 20 and 800 Hz. A minimum of one transducer is utilized and the wave generated signal is scanned through several different frequencies to move the location of the perceived stimulation from one body part or location to another in a massaging action. As indicated on page 7 of the subject application, by scanning frequencies from 48 to 58 Hz, for example, portions of the body along the entire back will be massaged. One method of accomplishing this, as indicated on page 11 of the application, is the turning of the frequency selection knob of the signal generator in a constantly changing manner with the stimulus moving at the rate of frequency change.

If desired, the amplitude of the signal can also be varied in similar fashion between 0 and 120 decibels to improve the sensory perception upon the body and perhaps the movement of the vibrating sensation. A rhythmic variation may also be added to the variation of the amplitude and frequency of the signal. Thus a pounding sensation can be applied, let one say, to the back as the massaging of the back is performed by the scanning of the appropriate frequencies.

The heretofore problem of stimulus fatigue, that is the effect of applying a specific frequency or very limited range of frequencies to a specific point or area of the body causing nerve fatigue in that area, is overcome by the massaging effect caused by the frequency scanning through a rather wide and variable range of frequencies.

Issues

Whether the examiner was correct in finally rejecting claims 1-8.

Grouping of Claims

Claims 1, 2, 3, and 6, may be grouped together. Claims 4 and 5 may be grouped together. Claims 7 and 8 are to be considered independently.

Argument

A - Section 112 Rejection

All claims of the subject application stand rejected under 35 U.S.C. Section 112, second paragraph, as being indefinite for failing to distinctly claim the subject matter which the applicant regards as his invention. Particularly, the examiner mentions that in claim 1, step D, it is not clear how to move the location of the vibration from one part to another part by only varying the frequency of the signal by scanning. The examiner appears to believe that some additional structural element is needed in order to move the location of the vibration.

It was thought that the examiner understood the theory of the applicant's invention since no question was raised by the examiner during the course of a personal interview regarding how the vibrations were moved from one body part to another. As Skille in his patent 5,101,810 explains in columns 5 and 6, for certain frequencies different areas of the body can be subjected to a vibro-acoustical influence. Further, as explained by the applicant, Dr. Charles Butler, on page 4, lines 14-17 of his application; it has been recognized or long known that specific parts of the body responds to specific frequencies. See also in the Appendix, page 4, a listing of frequencies as perceived in particular body parts compiled by Dr. Butler from various well know authorative publications. Thus, if one scans or substantially continuously varies the frequency through a transducer placed adjacent the body, various and changing areas of the body will

experience the vibrational effect due to stimulation as that particular part's or muscle's effective frequency is reached. This creates a massaging or moving effect along the body. In other words, the area of stimulation is dependent upon the signal frequency transferred through the transducer on to the body at that particular moment. As the frequency is changed, so is the muscle affected changed. As such, the vibrational massaging effect can be moved along the body through one transducer without any additional mechanical or electrical components. It is this principle that the examiner appears to have failed to recognize or understand.

In summary, claims 1-8 are definite and fully comply with 35 U.S.C. Section 112.

B - Definitions

Before discussing the 102 rejections of the examiner, it is best to ascertain the intended meaning of the terms "minimum of one transducer" and "scanning" as used by the applicant. The applicant's only independent claim, claim 1, refers to the movement of the location of the vibration from one body part to another by "said minimum of said one transducer." The examiner on page 5 of her Office Action reminds the applicant that the term "minimum of one transducer" can be any number that is more than one. This is incorrect. As indicated on page 9 of his application, lines 17 and 18, a single vibratory element or transducer is sufficient for the current invention. In comparing to the use of the term "minimum" in the applicant's claims with the term "minimum" by any dictionary definition, such term means the least quantity possible. See for example The American Heritage Dictionary or Webster's New Collegiate Dictionary. Therefore, the least quantity of transducers needed by the applicant is one.

With the regard to the definition of the word "scan" utilized by the applicant in his claims, as explained on page 6 of the subject application the applicant indicates his invention

utilizes "substantially continuous frequency variation" and "broad range scanning of frequency." He further states on page 6 as an example one could start in the vicinity of 40 Hz "scanning at variable rates" up to 58 Hz to create a pleasant massaging effect on the thighs as well as the lower and upper back. Thus the applicant utilizes scanning to define substantially continuous frequency variation. Numerous dictionaries refer to "scan" or "scanning" as a sweeping action or continuous change. See The American Heritage Dictionary, 4th Edition, Year 2000, Word Net Dictionary, The Merriam Webster Collegiate Dictionary, Dictionary.com, and the Collins English Dictionary, Year 2000. The term "scanning" as utilized in the physioacoustic field refers to a sweeping action as evidenced in the article appearing in Music Vibration published by Jeffrey Books in 1997 pages 209-215, (Appendix pages 5-16) with particular notation on page 210. This is further demonstrated in the diagrams appearing on pages 1 through 6 in The Physioacoustic Method by Petrilehikoinen, 1991 (Appendix pages 17-25). In both examples, frequency scanning is used for a singular particular muscle in order to have that muscle treated at the specific frequency in which the muscle naturally responds. This minute variation in frequency is used to accommodate the natural receptive frequency of a particular muscle as discussed in detail beginning at line 14 on page 4 and continuing to line 6 on page 5 of the subject application. This variation in frequency for a particular muscle or body part is also explained in column 2, lines 29-33 of the Murtonen patent 5,113,852. Movement of the vibrational effect from one body part to another through a single transducer was not contemplated or used.

On page 4 of her Office Action in paragraph 9 the examiner utilizes a definition of scanning which has no applicability to the subject matter of the claims. Just what does it

mean to "examine closely, or to search automatic for specific data". This means absolutely nothing with regard to the subject matter or field of the invention.

C - Claim Rejection Under Section 102

Claims 1-3 and 6-8 stand rejected Under Section 102 (b) as being anticipated by Murtonen patent 5,113,852.

First, it should be importantly noted that in column 1, lines 55-60, Murtonen concerned with stimulus fatigue indicates quite clearly that subjecting the body to a continuous vibration, even of varying frequency, will not produce the desired result. Murtonen did not realize that by varying the frequency of a continuous vibration, stimulus fatigue is avoided and the desired results obtained due to the movement of the vibratory sensation from one body part to another so as to allow recuperation of one body part while another body part is subjected to the frequency vibration. As prior art, Murtonen indicates that what the applicant is doing is not possible and should not be used. Secondly, as indicated in column 2, lines 52-55, at least two vibrating elements or transducers are required in Murtonen. Thus Murtonen can not practice the invention of the application which requires only one transducer to effectively operate. As such Murtonen can neither anticipate nor render obvious the invention of claims 1-3 and 6-8. Also in Murtonen the frequency being transmitted through each transducer is not continuously varied. It is the amplitude of a frequency that is continuously varied. The massaging effect in Murtonen is obtained through the discrete locations of a multiple number of transducers such as used in the Physioacoustic Method article, page 5, under Direction (Appendix page 24), and the phase offset between the intensity of the pulses produced by the different transducers.

Further, with regard to the applicability of Murtonen, the board's attention is directed to

two declarations which accompanied the response of the applicant of May 29, 2003. Copies of these declarations are attached to this brief (Appendix pages 26-48). One of the declarations is from the inventor Dr. Charles Butler and the other declaration comes from a Concetta M. Tomaino who is one of the leading authorities in the United States if not the world in neurophysiology through the use of sound, a field acknowledged in the background and summary of the invention found in the Skille patent 5,101,810, as well as the publications of record in Skille. Both Dr. Butler and Dr. Tomaino discuss the Murtonen patent and its factual and functional differences from the invention of the applicant concluding with their opinions that as people skilled the art neither would consider the invention of the applicant to be obvious and thus, also not anticipated. The examiner essentially discounted the declaration of Dr. Butler and failed to even mention the declaration of Dr. Tomaino.

With regard to claims 7 and 8, no reference cited of record suggests the use of multiple scanned signals at different areas of the body.

In summary Murtonen can not utilize a single transducer nor does he move the location of the vibratory effect by scanning.

Claims 1-3 and 5-7 stand rejected under Section 102 (b) as being anticipated by Skille patent 5,101,810. Skille, like other known prior art, utilizes individual frequencies for inducing a vibratory effect. Music is always used in conjunction with the frequency signal. The applicant does not require music. Skille does not utilize a scanning technique through a series of frequencies in order to move the vibratory effect from one body part to another. The examiner takes the position that Skille in column 5, line 66 through column 6, line 2 discloses scanning of frequencies. This is not true. First, the scanning utilized by the applicant in his claims and

referred to in his specification as "substantially continuous frequency variation", passing through all frequency values between upper and lower limitations. In Skille individual discreet frequencies are used namely 40, 60, and 80 with no intervening frequencies being utilized. Secondly, there is a six minute duration or pause between frequencies. This is also not a scanning movement or a substantially continuous frequency variation. Skille will not produce the functional massaging effect obtained from the applicant's invention. Again referring to the accompanying declarations of Drs. Tomaino and Butler, the Skille patent is discussed and distinguished from the invention of the applicant. These declarations from persons having ordinary skill in the psychoacoustical art indicate clearly the patentable differences between the Skille patent and that of invention as defined by the applicant with his frequency scanning. The examiner on page 5 of her Office Action, paragraph 10, ignored the declaration of Dr. Tomaino and found Dr. Butler's declaration deficient because it provides only opinions rather than facts. The declarations point out the differences between the prior art and the applicant's invention. This is a factual analysis. The examiner apparently takes the position that such declarations must indicate why the Murtonen and Skille references "cannot be able to perform the same method steps." The issue here is not whether certain references can be made to perform the steps of the applicant's method but whether such references teach persons having ordinary skill in the art the steps of the applicant's method. Further, in Murtonen, the required phase difference and multiple speaker use would prevent his using the applicant's method. In Skille, the music must be tied to a particular frequency and thus he could not use the applicant's method. See also the article in pages 238-239 of the Music Vibration publication written by Skille (Appendix pages 15-16). In summary, Skille utilizes, as Murtonen, individual, discreet frequencies to stimulate

individual parts of the body for an elongated and specific duration. As such, Skille neither anticipates nor renders obvious the invention of claims 1-3 and 5-7.

E - Section 103 Rejections

Claim 4 stands rejected under 35 U.S.C. Section 103 (a) as being unpatentable over Murtonen. In claim 4 the applicant is selectively varying the amplitude of the frequency signal between 0 and 120 decibels. First, Murtonen requires multiple transducers. Secondly, the examiner takes the position that while the description in Murtonen lacks detail regarding the selective variation of the amplitude between 0 and 120 decibels, a range of 0-120 decibels would be an obvious design choice. To the contrary, Murtonen specifically indicates that the amplitude is varied between the maximum and minimum value "other than zero", as stated in claim 1, line 17 of the claim. Why would one consider "zero" an obvious design choice when the reference specifically indicates otherwise? The applicant knows of no prior art in the physioacousitic field that uses a zero value for its amplitude vibrations. As such, claim 4 is not rendered obvious by Murtonen.

Claim 5 stands rejected under 35 U.S.C. Section 103(a) as being unpatentable over Murtonen in view of Skille. As mentioned previously, Murtonen requires the use of at least two or more transducers in order to move the signal from one body part to another. This is contrary to the teaching of the applicant's application and thus even if Murtonen's signal was provided with music, it would not serve to render obvious the applicant's invention utilizing a minimum of one transducer to provide a scanning signal whose amplitude can be selectively varied between 0 and 120 decibels. In Murtonen, the amplitude is varied between a maximum and minimum value other than zero.

Conclusion

It is respectfully submitted that claims 1-8 of the subject application are allowable over the prior art of record. The applicant's method of scanning to move the vibration produced by the frequency signals from one body part to another thereby inducing a massaging action is new and novel.

Respectfully Submitted,

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James D. Hall, Reg. No. 24,893

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APPENDIX

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CLAIMS

Claim 1: The method of providing vibrations to the body of a human or an animal comprising the steps:

A. Providing a wave generation device associated with a minimum of one transducer;

B. Locating said transducer next to said body;

C. Actuating said wave generation device to cause said transducer to provided signal producing a vibration in said body; and

D. Varying the frequency of said signal by scanning to move the location of said vibration from one part to another part of said body by said minimum of said one transducer.

Claim 2: The method of claim 1 wherein said frequency is selectively scanned between 20 and 800 Hz.

Claim 3: The method of claim 2 and including the step of varying the amplitude of said signal.

Claim 4: The method of claim 3 wherein said amplitude is selectively varied between 0 and 120 decibels.

Claim 5: The method of claim 4 and including a step of providing a rhythmic beat to the said signal.

Claim 6: The method in claim 1 wherein said signal is in sine wave form.

Claim 7: The method of claim 1 wherein step C includes producing multiple vibratory signals each producing a vibration adjacent a different area of said body, and step D includes varying the frequency of each of said vibratory signals by scanning to move the location of each vibration from said one part to said another part of said area of the body.

Claim 8: The method of Claim 7 wherein said signals are non-synchronous and including the step of introducing a pause between said scanned signals.

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Frequency	BodyLocation	AuthoritativeSource
30 to 40 Hz	ankles&calves	Wigram/Weeks 1989
40 Hz	Central Nervous System	Lehikoinen 1994
40 Hz	Calves, Thighs	Wigram/Weekes 1989
40 to50 Hz	Knees, thighs,low abdomen	Skille/Wigram/Weekes 1989
50Hz	Thighs, Sacrum	Wigram/Weekes 1989
50 to 60 HZ	lumbar to thoracic area	Wigram/Weeks 1989
52 hertz	back	Wigram 1989
60+ Hz	neck&head	Wigram/Weekes 1989
68 hertz	shoulders	Skille 1989

MUSIC VIBRATION AND HEALTH

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CHAPTER TWENTY

THE PHYSIOACOUSTIC METHOD

Petri Lehikoinen

History

The Physioacoustic Method is based on knowledge obtained from extensive clinical work in music therapy. The first clinical trials in Finland were conducted with mentally and physically handicapped children. As Juliette Alvin, Paul Nordoff, Clive Robbins and many other pioneers of music therapy have agreed, music has a very strong effect on the human body and mind, whether these function in a normal or restricted way. Because handicapped people usually need increased sensory stimuli, sound is one kind of sensation which can easily be used for therapeutic and recreational purposes.

One of the important findings in the early trials was that music provides not only acoustic information to be heard, but also vibrational information to be perceived by the tactile sense. This finding was of great importance, especially in the therapy of hearing-impaired and multiply handicapped children. People who are not able to hear often rely on their sense of touch as a means of compensation. For example, there are deaf musicians who are able to read music through vibrations from the musical instruments.

The first experiments with the physioacoustic method were conducted at the Rehabilitation Center for Deaf and Hard of Hearing in Helsinki (Kuulonhuoltoliitto) in the 1970's by using music with a strong bass. The music was converted into body sensations by having the patients sit on top of loudspeakers, by leaning against the backside of a piano or by putting their hands on the skin of a bass drum. There are numerous ways of perceiving vibrations instead of through normal hearing. In fact, all sound is first just physical energy which spreads through the air in all directions. In the sensory nervous system, sound is perceived as auditory structures in the acoustic area of the cortex. It is obvious that sound activates large areas of the nervous system and stimulates psychophysiological functions. These basic findings were the foundation for the physioacoustic method and equipment.

Physioacoustic Equipment

The physioacoustic method is a rather unique therapeutic technique. A physioacoustic system consists of the following items: the adjustable chair, the computer unit inside the chair, the audio system and the transformer.

The system utilizes normal electrical current, with one cord for the transformer and another for the music unit. The transformer reduces the current to two circuits of 15 volts each in the device. Thus, there is no risk for electric shock. Low frequency sinusoidal sound comes from the computer which is specifically designed for the physioacoustic system. It controls the basic sound parameters as well as the programs. The music is specially selected, or even composed, for this method. Thus, it is possible to choose music which is ideal for this method and which also meets the musical expectations of the client. The physioacoustic device gives the therapist an extraordinary ability to mix the low frequency sound signal and music together so as to produce the ideal physiological and psychological therapeutic effect.

The physioacoustic device uses low frequency sinusoidal sound combined with specially selected music. The frequency range varies from 27 Hz to 113 Hz. This low frequency sound comes from a specially designed computer. Any sound source (a CD or tape player, for example) can be used to produce the musical effect. Three sound parameters are important in the physioacoustic method: pulsation, scanning, and direction.

Pulsation. The low frequency sound varies in a certain, controlled time sequence. The purpose of power pulsation is to prevent muscle contraction. Continuous stimulation commonly causes numbness and contraction. With the sound pulsating slowly, this effect can be avoided, and relaxation is obtained instead.

Scanning. The computer causes the frequency to vary within a certain amplitude and speed. This is necessary to guarantee that each muscle is treated at its optimal frequency, i.e., the pitch at which a particular muscle responds naturally.

The approximate resonance frequencies are known, thanks to basic research conducted in the field of physiotherapy. The research work in the Karolinska Institutet in Stockholm has supported these ideas. Professor Thomas Lundeberg and others (1988) have found that vibrations are useful in the treatment of muscle pain. To obtain relief, the frequency must be precise, however. In the physioacoustic method, the frequencies are programmed in the computer memory, and the program makes the sound vary around these frequencies. This ensures that at a certain point, the ideal resonance frequency is indeed reached. At that moment the muscle responds to the stimulation. During a therapy session (usually 20 minutes), the response (vibration effect) of the muscle is triggered dozens of times. Each time the muscle responds, the extent of relaxation grows. This allows a program to be designed so that every muscle and each part of the body can be treated in the best possible way. Treatment for the whole body and for specific areas can be combined in one program.

Direction. Sound can be made to move from the lower parts of the body upwards or in a reverse direction. The ability to change directions

appears to be beneficial in the treatment of certain stress-related symptoms, such as psychosomatic pains and muscle tensions. The movement of the sound causes a traveling sound pressure inside the body. This pressure has an effect on the vascular system and lymphatic circulation. It also stimulates the neurotransmitters (chemicals which transmit information through neural pathways to the brain). There is evidence that physioacoustic treatment has an effect on endorphines which control emotional experiences. This is especially useful in the treatment of depression.

Pulsations, scanning and direction together provide enormous possibilities in designing programs to meet individual therapeutic needs. It is possible to make a change in the program when it seems to be therapeutically appropriate even in the middle of a session.

Major Applications of the Physioacoustic Method

In Finland, the physioacoustic method is used in six major medical or educational settings: 1) in occupational health services and preventive health care, 2) in hospitals, 3) in rehabilitation of the disabled, 4) in sports medicine, 5) in education and training, and 6) in psychotherapy and psychiatric treatment.

In occupational health care, various stress syndromes are the most prevalent problems. This is seen in the high number of disability claims in which job pressure appears to be the major cause of the illness. Among office workers, especially those involved in computers or word processing, neck, shoulder, and back pain may severely impede work capacity. Many people are also troubled by insomnia and emotional tension. Generally speaking, almost everyone is in need of effective and regular stress-reduction techniques.

In hospitals, the physioacoustic method is used in many ways. Relaxation is important, because chronic patients often suffer from pains caused by long periods in uncomfortable positions. Bed sores are a problem especially for elderly patients. Physioacoustic treatment can stimulate the blood circulation and thus give relief in these conditions.

In the rehabilitation of handicapped children, the physioacoustic method has been used in many institutes in Finland. The results have been positive, especially in the treatment of severely brain-injured children, in persons with cerebral palsy, and in patients with severe symptoms of autism, self-abusive behavior and aggression. In follow-up studies, it has been suggested that the results of this treatment may be long-lasting.

In sports medicine and training, the results have been most interesting. Several top ski jumpers, cross-country skiers and tennis, soccer and football players have used the physioacoustic device since the fall of 1990. They report that the device has helped them to relax during intensive training and competition. Subsequently, this has improved their ability to concentrate, has helped them to rest more completely, and has enabled them to perform

at their optimum level.

In mental training and education, the physioacoustic method is used for small group training of executives or innovations teams, with the chairs connected.

In psychiatric treatment, trials with chronic psychotic patients at the Helsinki City Psychiatric Hospital (Nikkila Hospital) revealed that physioacoustic treatment helped patients with psychoses, such as catatonic schizophrenia and hebephrenia. The increased muscle tension of catatonic patients was decreased during physioacoustic therapy.

At the Helsinki University Central Hospital, trials with neurotic patients were conducted by Hannu Naukkarinen, M.D. (1990) in the Clinic of Psychiatry. Eight volunteer patients (ages 32-67) participated in the experiment. The purpose of the research was to determine if low frequency vibrations combined with music would alleviate physical anxiety, tension and pain. The following dependent measures were taken four times during treatment: 1) subjective feelings of pain; 2) subjective feelings of tension; 3) subjective feelings of anxiety; 4) subjective feelings of depression; 5) sleep problems; 6) systolic blood pressure; 7) diastolic blood pressure; 8) pulse; 9) state anxiety scores (Spielberger); 10) trait anxiety scores (Spielberger); 11) total anxiety score (Spielberger); and 12) anxiety score (Zung scale).

Statistical analyses revealed that there were reductions in all dependent measures as a result of the physioacoustic therapy, and there were significant reductions in pain, tension, subjective feelings of anxiety and total anxiety scores.

It was concluded from this pilot study that the physioacoustic treatment appears to be a promising method of therapy for this group of patients. It was recommended that future research involve larger numbers of subjects in control and placebo groups.

Future Applications

There are some interesting findings that impact on physioacoustic therapy in current brainwave research. At the University of Helsinki, Professor Naatanen and his team (1992) have found that the 40-Hz frequency from the thalamus area has an important role in the regulation of auditory-evoked potentials.

Professors Llinas and Ribari (and others) (1993) have found, that in some exceptional cases, such as beginning Alzheimer disease, narcotic states and some brain injuries, the 40 Hz brain wave disappears or is disturbed. Llinas has suggested that with auditory stimulation using a 40 Hz sound, it is possible to reinforce this thalamus frequency.

The present author has also found that that 40 Hz stimulation through the ears and body has potential in the rehabilitation of brain injured and stroke patients. Most programs in the physioacoustic method are based

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primarily on the 40 Hz frequency. Special programs of course employ other frequencies as well.

Side Effects

In everyday environments, people receive uncontrolled vibration from vehicles and heavy machines. However, in the physioacoustic method, the vibration is controlled and tested. The physioacoustic method uses frequencies from 27 to 113 Hz, normally for 20 minutes.

Possible side effects reported by patients who have received physioacoustic therapy are: slight drowsiness, vertigo, or feelings of nausea during or after the first treatment. These symptoms usually disappear after three to four sessions, and they may be decreased by adjusting the chair to a more upright position and using less power.

Case Study #1

Case #1 was a 11-year-old girl suffering from a rare genetic brain disease, (Calcification intracerebralis familiaris idioathica), which slowly destroys the brain. Patients with this disease have a very short life span and often die before adolescence. She was already at the terminal stage with a prognosis of several months to live, and medical treatment had been discontinued when physioacoustic therapy was begun. Her physical condition was very poor at this time: she had impaired blood circulation and digestion, her mobility was severely reduced and most of her muscle tone was spastic. It was hoped that physioacoustic therapy would reduce her discomfort during her last months. Therapy was applied every week day (five times a week) for twenty minutes. After two months, the sessions were reduced to 2-3 times per week. The patient responded to the treatment rapidly. During the very first sessions, the enjoyment was quite obvious. After two weeks, some of her natural reflexes such as swallowing and yawning improved. After six months, her movement improved so much that the patient was able to start painting using water colors. Her digestion and circulation also improved considerably. In 1993, after three years of treatment, her physical condition was stable, and she needed only occasional treatments (Leppala, 1993; Lehikoinen, 1990).

Case #2

Case #2 involved a 27-year old free-style skier training for the Albertville Winter Olympics. He had a severe muscle problem which was diagnosed as a piriformis syndrome at the Sport Medicine Centre of Diakonissalaitos in Helsinki. The problem began during his training and competition tour in December in the USA, and the patient had to interrupt the tour because of his disorder.

The physioacoustic treatment was started 1/27/92 (unfortunately at a very late date which allowed only one and a half weeks for physiotherapy treatment). At the beginning of therapy his muscles were very sore, so the first goal was to decrease the pain and the possible muscle inflammation. For this purpose, very low frequencies (just above FysAc zero level) were used. At the beginning also, gravitational traction was used in the 30 degree angle. Following, cramped muscles in the symptomatic area were targeted for relaxation, and frequencies of 88-38-20-0 were applied. The pulsation used at the beginning was fast (10-25 cycles) and gradually slowed at the end of the session to 60-100-199 cycles.

For the second half of the session (15 minutes), program 4 was used to increase thigh and leg strength, and the gravitational traction angle was increased slowly to 90 degrees. The patient received six treatments in all and was able to compete in Albertville. Unfortunately, the athlete fell during competition, was unable to compete in the finals, and eventually required surgery because of muscle damage.

Case #3

Case #3 involved an eight year old girl who was involved in a traffic accident and had sustained severe head injuries. She remained unconscious for three and a half months, after which time she was totally paralyzed and was given little hope of recovery. However, a neurologist at the Tampere University hospital recommended that physioacoustic therapy be attempted for a three-month experimental period. The insurance company rented the system for the child to be used twice a day in her home. A physical therapist was hired to work with her and monitor her progress (Ronnholm, 1993).

After three months the following progress was reported: 1) her spasticity and tonic reflexes had decreased; 2) her mobility had increased, and she was able to control her head position and use her hands to run an electronic communicator. Some mobility was seen in her legs as well; 3) her digestion and metabolism were functioning better, and lactic acid was not remaining in her muscles, thus reducing pain and increasing flexibility; 4) her sleep had become deeper and better; 5) her mental condition had improved, and she was hopeful and happy; and 6) loud laughter and expressive vocal activity were reported by the speech therapist, although she was still unable to produce words. The physioacoustic system also seemed to help her parents relax and deal with the situation.

Because of these results, the neurologist and physical therapist recommended physioacoustic treatment be continued daily, and the insurance company purchased the system for the child. As of December, 1993, the patient continued to show progress in using her voice expressively. Her coordination and muscle functions were improving, and her psychological and physiological conditions were considered stable.

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CHAPTER TWENTY-THREE

MAKING MUSIC FOR VIBROACOUSTIC THERAPY

Olav Skille

History

Music is considered to be an art form received mainly in the ear. We know that musical instruments emit vibrations which can be felt when we touch the surfaces of the instruments with our hands, but the feeling of vibration has no informative value for hearing individuals. Music is a form of behavior which is specific to human beings and is used for communication and emotional expression.

However, there is something strange about music. As communication between cultures has increased, we have found other kinds of music than our own - and other uses for music of which we have been unaware. Some of this music is so odd that we hardly can call it "music", and we can often react with negativity to such music.

But music is used functionally in our society and in other societies in spite of the differences in musical expression. Music is used in celebrations, accompanying grief, joy, for relaxation and sleep, and even for healing purposes. This means that there must be some universal factors in music which cannot be explained along cultural lines of definition. Nor can we use classical (aesthetic) music theory to explain the generally common human features in the functionality of music. There must be elements in music which have effects on human beings that are independent of cultural differences in expression.

In order to find the answer to some of the questions which arise, it is necessary to isolate some of the elements in music and see if we can find some universality in the effect of these elements.

Empirically, I have found three such factors so far: 1) low frequencies can facilitate relaxation; 2) rhythmical music can stimulate; and 3) loud music can provoke aggressive feelings. The opposites of these universals create contrasting effects.

There are two more factors - harmony and timbre - (in the classical sense), but they are composed of too many different elements to be totally culturally independent. For the time being we do not know enough about them in this context to include them in our list of universal elements.

From 1968 to 1980 these three universals were subject to my philosophical and practical consideration in relation to Vibroacoustic (VA) therapy, and in 1980, I tested the first prototype to be used in a new musical context (Skille, 1982, 1986). Transferring music directly to the human body

music I used. This gave us an additional element which could be quantified, both in frequency and amplitude.

When I stumbled upon the amplitude variations which, in a way, masked or overrode the rhythmical elements in the original music, the mixture of music with gentle sinusiodal amplitude variations of added low frequencies tuned with the music, gave birth to the concept of VA Therapy taped programs. The logic behind this concept is very simple. Music alone has both a physical and emotional effect on us when we listen with our ears. Frequencies alone have a profound physical effect on us when we transfer the frequencies directly to our body. It was then very natural that I combined these elements in order to obtain even deeper effects, both on body and soul.

In the pioneering years, there was a very close cooperation between myself and the Finnish music therapist, Petri Lehikoinen, and his colleagues, the electronics engineer, Salomo Murtonen, and the composer, Otto Romanowski. Murtonen constructed an electronic unit for VA Therapy after my specifications, and Romanowski composed the first musical piece originally made for VA Therapy - "E-vib." "E-vib" was based on the overtone fractals of a basic 40 Hz frequency which I recorded together with the bass elements. For wider use I also mixed in 52 Hz (fourth), 68 Hz (sixth) and 86 Hz (ninth).

We tested the effects of frequencies on the staff in our institution, and they identified a maximum effect on back problems and menstrual pains at 52 Hz, neck/shoulder pains at 68 Hz and headache/migraine at 86 Hz. I did not, and still do not, have equipment which can identify frequencies by decimals, so I always had to work with approximate values.

Since the early 1980's I have made over 350 VA therapy tapes for empirical use and have evaluated their effects on various problems. Several composers have also given me compositions specially made for VA Therapy. Some compositions have come with low frequencies included (such as those by Sjøholt). I can now categorize 3 types of music which I use predominantly for VA Therapy:

1. Music Made for VA Therapy Based on Overtone Fractals

In some articles I have called this music "fractal music," but as this term is used for music composed on the fractals of the Mandelbrot set, it may be more correct to call this music "VA Therapy compositions." For VA Therapy compositions, the composers use the mathematical interrelations between the tones of the chromatic scale and the rules of classical harmony and the overtone scale to construct melodic lines and harmonic structures which are intended to re-harmonize an individual who has come "out of tune" with himself.

The mathematical basis for this is presented in Table 1. This table can be used when I make the computations necessary for composing music for VA

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Therapy. It can also be used to calculate alternative frequencies or complementary frequencies when I choose frequencies adapted to special conditions when I mix VA Therapy programs. When a composer makes music for VA Therapy, he or she is using just one frequency, or an harmonic sequence as a basis for the composition. From this base, single tones or tone clusters will emerge. The musical frequency range is not limited to the vibroacoustic area, and the composer will therefore have a considerable range of freedom for his or her work.

Music composed for VA Therapy is rhythmically floating. It has no direct melodic structure or musical theme which can be associated with any known piece of music. In this way, the time spent in the therapy chair or bed gives the user the possibility to be free from associations with music from everyday life, and he/she will be more able to concentrate on the processes which are taking place inside his/her body. The user often loses the sense of time and may often experience the effect of VA Therapy as being like the feeling one has when waking up from a good long night's sleep. This effect will, hopefully, induce a sense of total relaxation and implies a harmonic synchronization of nerve impulses in the whole body.

Users of VA Therapy usually agree with the statement above, but there are some users who feel uneasy or anxious when they are exposed to music without familiar structure or direction. It is therefore necessary to include in the VA Therapy arsenal of music types of music which are more familiar to these users.

2. Relaxation Music with Frequencies Added

When I cannot use music specially made for VA Therapy purposes, I must use functional music made for listening purposes. The techniques used for choosing music are well described in the literature and are used both in music therapy and psychotherapy/guided imagery. There exist several kinds of music especially made for relaxation purposes.

When such music is used for VA Therapy purposes, I must find one basic frequency which can be used throughout the entire musical piece. If the listening program is composed of separate units, I can change frequency in pauses between the units. If possible, I avoid music with modulations from the basic key. Musically, this can be quite a challenge sometimes. When I make customized VA Therapy programs for special purposes, the freedom of choice is still more difficult, because I must try to satisfy both harmonic and therapeutic parameters.

The maker of VA Therapy programs must therefore be skilled in both musical and therapeutic disciplines in order to make effective programs. Relaxation music for listening purposes often has the harmonic simplicity and structural unity which make it comparatively easy to find VA Therapy frequencies which both satisfy musical and therapeutic needs.

The Physioacoustic Method

Petri Lehikoinen

The Physioacoustic Method

Second edition of the English version

Kalamazoo, Michigan
U.S.A.

The Physioacoustic Method

(summary)

The Physioacoustic method is a new therapy technique based on advanced computer technology. The method uses low frequency sinusoidal sound waves combined with specially selected music. In Finland the method has been succesfully used in rehabilitation of brain injured and handicapped people and for stress related symptoms like neck and back pains, muscle tensions, hypertension and insomnia.

The physioacoustic method has been developed in Finland during the past ten years. The first team "Vibra Group" was established in 1980. The members of this group were Matti Karjalainen, professor of acoustics, Helsinki University of Technology; Matti Kaje, computer engineer, Xena Inc. ; Otto Romanowski, composer of electro-acoustic music, Sibelius-Academy; Hannu Naukkarinen, M. D. , Helsinki University Central Hospital; Jari Suvilehto, Cand. Med., Helsinki University; Maija Lindgren, special teacher for deaf (secretary); Erkki Kureniemi, computer- and robot designer, Nokia Inc. and Petri Lehikoinen, psychologist, music therapist, Sibelius-Academy (chairman).

A new group "Next Wave" was established in 1988. Salomo Murtonen was responsible for the development of the electric and computer technology, Petri Lehikoinen for the treatment programs and Roland Potrykus for public relations and information. This group completed the physioacoustic system in 1989.

Experiments on prototypes have been going on since the early eighties. The first clinical trials were conducted in the following handicapped rehabilitation centers: Pääjärven Kuntoutuskeskus, Paimenentien Opetus- ja Työkeskus, Kuulonhuoltoliitto and Suojarinteen Keskuslaitos. After these trials the method spread rapidly to other areas such as corporate health care, psychotherapy and sports training and sports medicine. In 1990 the device was in use for a total of 10,000 hours. The number of patients treated by the physioacoustic method to date is about one thousand.

The only side effects found so far have been an occasional feeling of drowsiness, nausea or vertigo. These symptoms usually disappear during the third or fourth session.

The research work conducted at the Karolinska Institutet in Sweden equally confirms that the vibration treatments do not have significant adverse effects.

History

The Physioacoustic method is based on knowledge obtained from a long experience in music therapy. The first clinical trials in Finland were made in the rehabilitation of mentally and physically handicapped children. As Juliette Alvin, Paul Nordoff, Clive Robbins and many other pioneers of music therapy have stated, music has a very strong effect on the human body and mind, regardless of whether these function in a normal or restricted way. Because handicapped people usually live deprived of all kinds of stimuli, it is understandable that all impulses are welcome to them. Sound is one kind of sensation which can easily be used for therapeutic and recreational purposes.

One of the important findings in the early trials was that music is not only acoustic information to be heard, but also vibrations to be perceived by the tactile sense. This finding was of great importance, especially in the therapy of hearing-impaired and multiply handicapped children. People who are not able to hear have to use their sense of touch to compensate for the loss of hearing. There is plenty of evidence to prove that deafness can be compensated in this way. There are deaf professional musicians who are able to read music through the vibrations from the musical instruments (Glennie, E. , 1990, Good Vibrations).

The first experiments with the physioacoustic method were conducted at the Rehabilitation Center for Deaf and Hard of Hearing in Helsinki (Kuulonhuoltoliitto) in the 1970's by using regular music with a strong base effect. This music was converted into body sensations by having the patients sit on top of loudspeakers, leaning against the backside of a piano or putting their hands on the skin of a base drum. There are numerous ways of perceiving vibrations in-stead of normal hearing. In fact, all sound is first just physical energy which spreads through the air in all directions. In the sensory nervous system sound is perceived as auditory structures in the acoustic area of the cortex. It is obvious that sound activates large areas of the central nervous system and stimulates psychophysiological functions. These basic findings were the foundation for the physioacoustic method and device.

The Physioacoustic Device

The physioacoustic device uses low frequency sinusoidal sound combined with specially selected music. The frequency range varies from 27 Hz to 113 Hz. This low frequency sound comes from a specially designed computer. Any sound source (a CD or tape player for example) can be used to produce the musical effect. Three sound parameters are important in the physioacoustic method: pulsation, scanning and direction.

Pulsation: The low frequency sound is varying in a certain, controlled time sequence. The purpose of power pulsation is to prevent muscle contraction. Continuous stimulation commonly causes numbness and contraction. With the sound pulsating slowly, this effect can be avoided and relaxation is obtained instead.

Scanning: The computer causes the frequency to vary within a certain amplitude and speed. This is necessary to guarantee that each muscle is treated at its optimal frequency, i.e. the pitch at which the particular muscle responds naturally.

The approximate resonance frequencies are known, thanks to basic research made in physiotherapy. The research work in the Karolinska Institutet in Stockholm has shown that this basic principle is valid. Professor Thomas Lundeberg has proved that vibrations are useful in the treatment of muscle pain. To obtain relief, the frequency must be absolutely correct. In the physioacoustic method the frequencies have been programmed in the computer memory and the program makes the sound vary around these frequencies. This ensures that at a certain point the ideal resonance frequency is indeed reached. At that moment the muscle responds to the stimulation. During a therapy session (normally 20 minutes) the response (vibration effect) of the muscle is triggered dozens of times. Each time when the muscle responds, the extent of relaxation grows. This allows a program to be designed so that every muscle and each part of the body can be treated in the best possible way Treatment for the whole body and for specific areas can be combined in one program.

Direction: Sound can be made to move from the lower parts of the body upwards or in reverse direction. The ability to change direction appears to

be beneficial in the treatment of certain stress related symptoms such as psychosomatic pains and muscle tensions. The movement of the sound causes a traveling sound pressure inside the body. This pressure has an effect on the vasculatory system and the lymphatic circulation. It also stimulates the neurotransmitters (chemicals which transmit information through neural pathways to the brain). There is evidence that the physioacoustic treatment has an effect on endorphines which control emotional experiences. This is especially useful in the treatment of neurotic depressions.

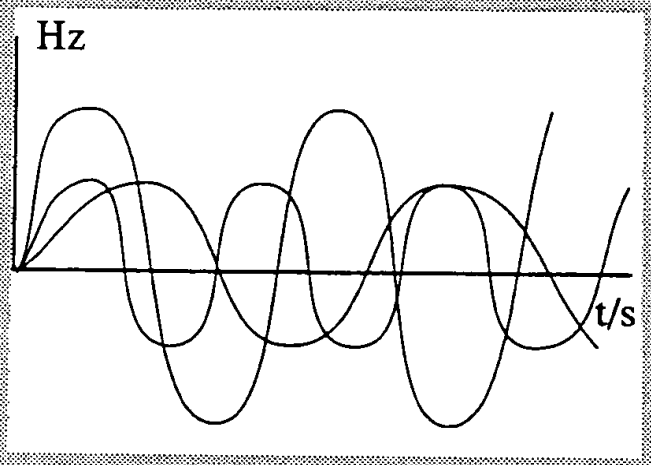
Pulsation, scanning and direction together provide enormous possibilities in designing programs to meet individual therapeutic needs. It is possible to make a change in the program when it seems to be therapeutically appropriate even in the middle of a session.

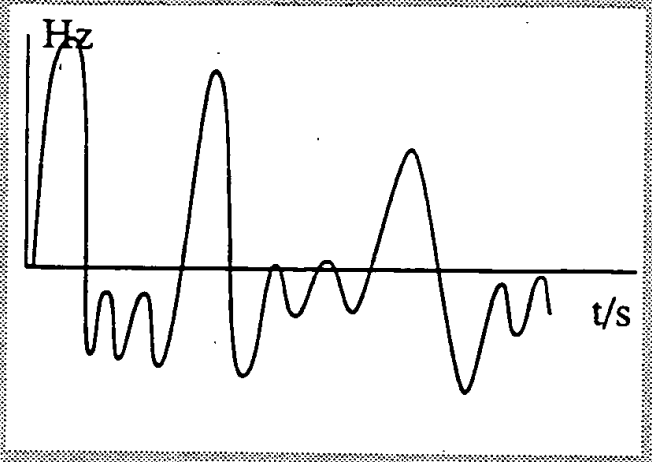
Technical Description

The physioacoustic method is a unique therapeutic technique. A physioacoustic system consists of the following items: the adjustable chair, the computer unit inside the chair, the audio system and the transformer. The system utilizes normal electric currency, with one cord for the transformer and another for the music unit. The transformer reduces the current to two circuits of 15 volts each in the device. Thus there is no risk of electric shock.

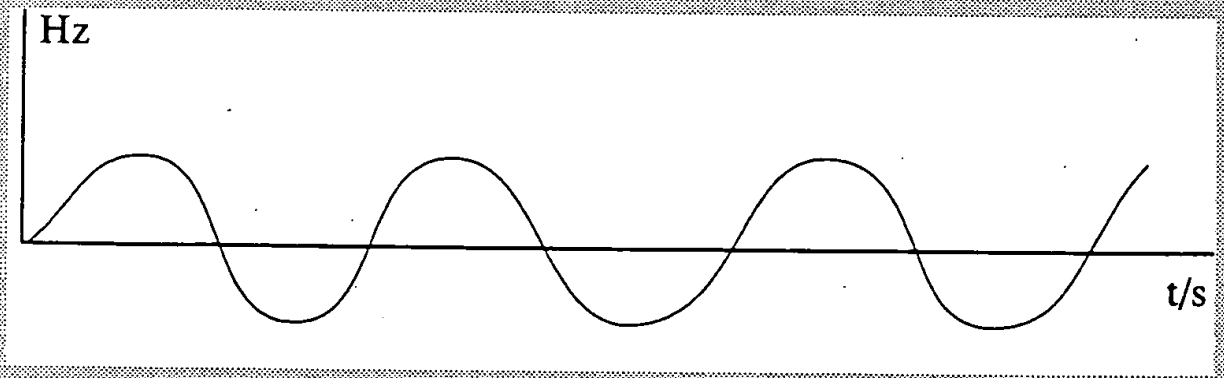
Low frequency sinusoidal sound comes from the computer which is specifically designed for the physioacoustic system. It controls the basic sound parameters as well as the programs. The music is specially selected, or even composed, for this method. Thus it is possible to choose music which is ideal for this method and which also meets the musical expectations of the client. The physioacoustic device gives the therapist an extraordinary ability to mix the low frequency sound signal and music together so as to produce the ideal physiological and psychological therapeutic effect.

Combination sound





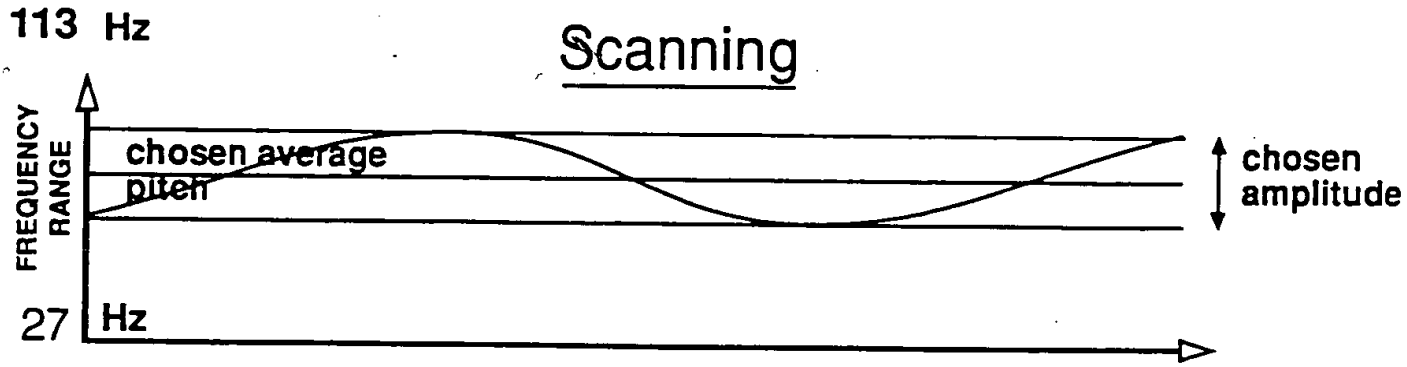
Sinusoidal sound



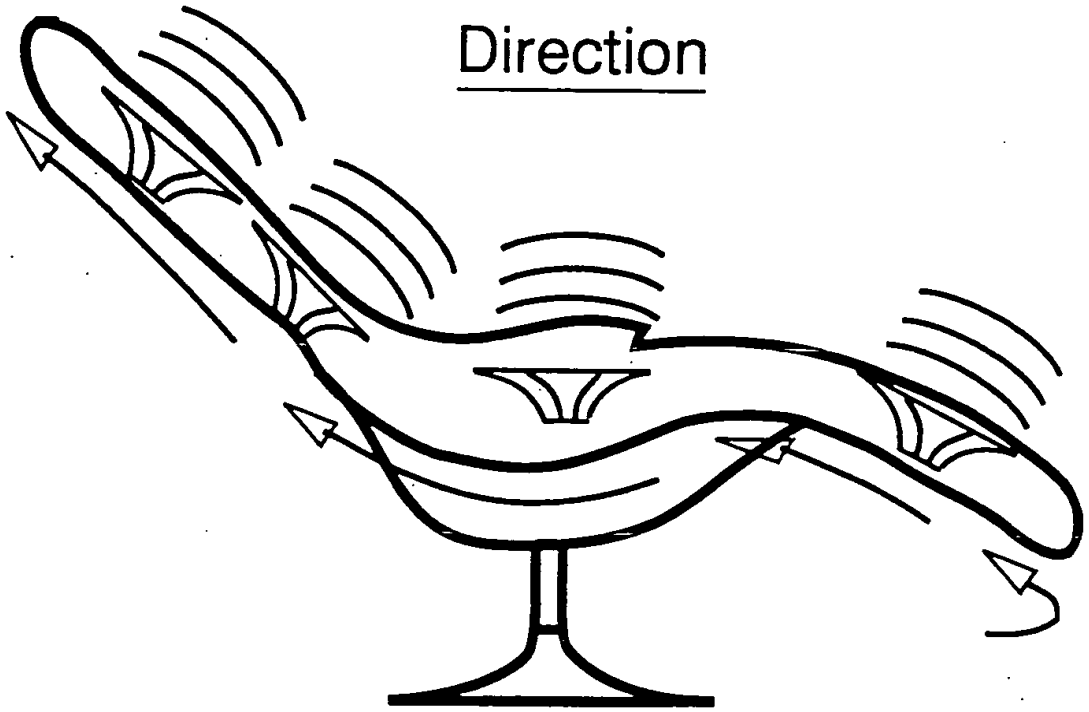
Three changing parameters of sound in the Physioacoustic treatment

Power pulsation

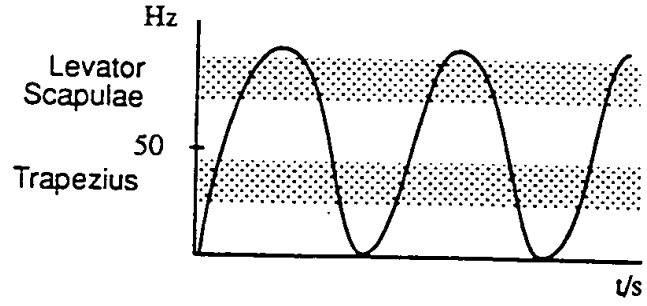
Scanning

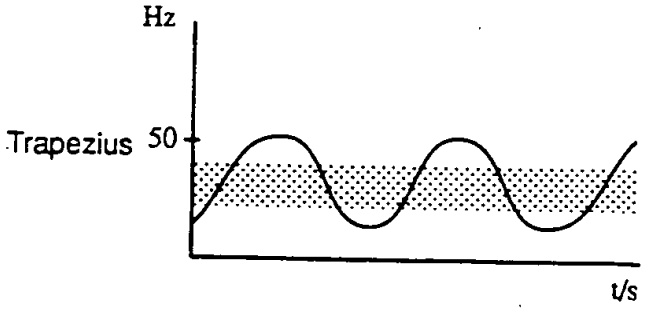


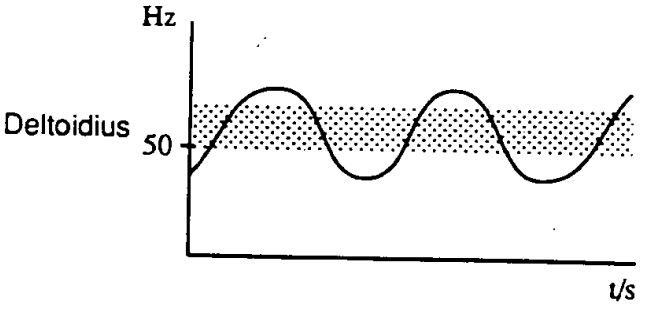
Direction

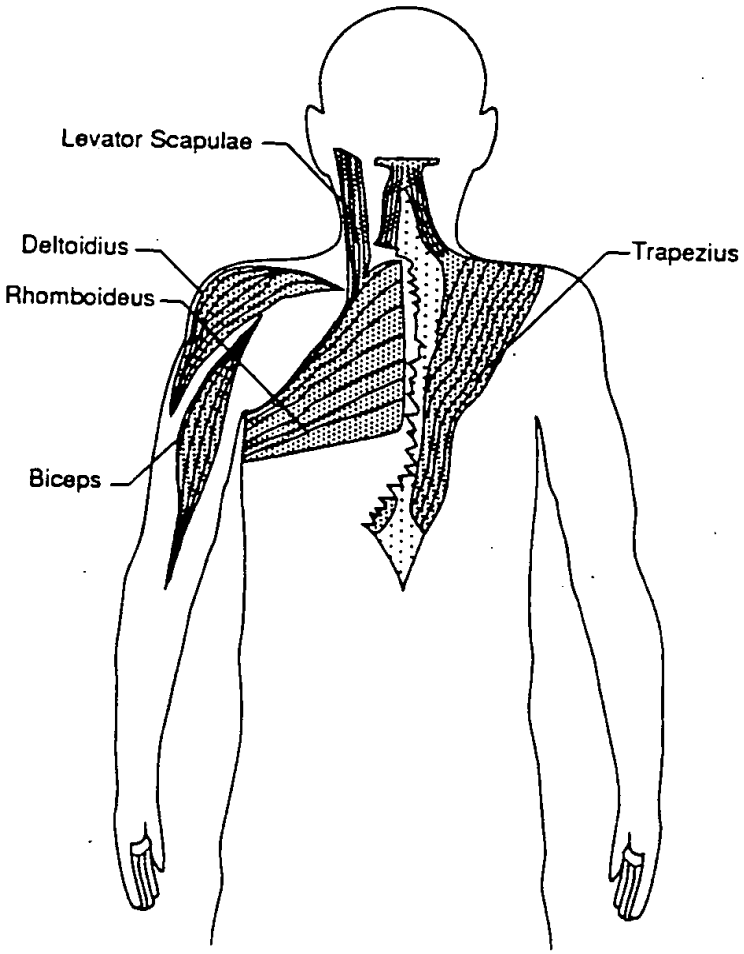


Scanning Effect









IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Charles F. Butler		
Serial No.:	10/039,303	Art Unit:	3764
Filed:	January 2, 2002	Examiner:	Justine Romang Yu
For:	SIMULATED WAVE MASSAGE		

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

RULE 132 DECLARATION

1. I am the inventor of the above subject application and my Curriculum Vitae is attached hereto

2. To the best of my acknowledge and belief I am the first to provide a method of applying acoustical vibrations to the human body using but a single transducer which in response to a signal produces a vibration in the body and thereafter bearing the frequency of the signal by a continuous or scanning movement to move the location of the vibration from one body part to another body part.

4. I have been provided and have reviewed U.S. Patent 5,101,810, in which at least two loud speakers or transducers are utilized to produce a vibratory effect accompanied by music in a particular part of the body. A particular signal frequency is used for a specific body part for a specific length of time. While the frequency used in patent 5,101,810 can be varied, it is done so in separate increments. This patent teaches or instructs in the usage of a specific frequency for a specific body part used for a specific length of time.

5. I have also been provided a copy of U.S. Patent 5,113,852 and find that it is directed to what the inventor here calls muscle fatigue. The inventor here indicates in column 1 on line 57 that

this problem of muscle fatigue exists whether one use a constant frequency or a varying frequency. The inventor of this patent did not realize that beneficial therapeutic results can exist by the use of varying the frequency. In this patent at least two transducers are needed. In this patent the vibratory effect is moved from one speaker to another by inducing a signal phase difference at the respective transducers.

6. In considering patents 5,101,810 and 5,113,852, neither patent suggests to the method of producing a wave-like or moving vibration location in the body by varying the frequency of a signal by scanning. The inventor in patent 5,101,810 utilized discreet frequencies without any continuous movement or scanning while the inventor in patent 5,113,852 utilized a phase off-set for the signal to produce a wave-like vibration available only through at least two transducers.

7. In summary, my invention of actuating a wave generation device to cause a transducer to provide a signal producing a vibration in the body and thereafter varying the frequency of the signal by scanning to move the location of the vibration from one body part to another by the minimum of one transducer is not obvious from the prior art as it is known to me.

I hereby declare that all statements made here are of my own knowledge are true and are all statements made on information and belief are believed to be true: and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 118 U.S.C. 1001.

Charles F. Butler, M.D.

Date: May 14, 2003

CURRICULUM VITAE

NAME: **CHARLES FRANCIS BUTLER**

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DATE AND PLACE OF BIRTH: July 24, 1943
New York, New York

CURRENT PROFESSIONAL ACTIVITY: **Physioacoustics**

PAST PROFESSIONAL ACTIVITY:

Boards of Directors
Institute for Music and Neurologic Function
Beth Abraham Health Services
Bronx, New York
November 1999 to present

Music Therapy and Heart Transplant
Research Board
Temple University
Philadelphia. Pennsylvania
February 2000 to present.

Director of Cardiac Surgery
Bronson Methodist Hospital
252 East Lovell
Kalamazoo, Michigan 49007
July 1986 to July 1995

President, Founder
Midwest Cardiothoracic Surgery Center
November 1982 to present

CEO, President, Founding Member
Healthcare Midwest (Group of 42
Physicians)
Kalamazoo, Michigan
1993 -1995

Kalamazoo Cardio-Thoracic Surgery
Group Practice
Kalamazoo, Michigan
December 1981 to October

Director of Cardiac Surgery
St. Francis Hospital Medical Center
Monroe, Louisiana
July 1979 to November 1981

MARITAL STATUS AND DEPENDENTS:

Married: Penelope Johnson
Children: Charles, Erin, and Brendan

MILITARY SERVICE:

United States Air Force / Air National Guard
Major Flight Surgeon
March 1972 to April 1980

EDUCATION:

Undergraduate

St. Joseph's College
New York, New York
(Philosophy, English, Literature, and Classics)
B.A. Summa Cum Laude, 1965

Graduate

Gregorian University
Rome, Italy
Fellow, 1965 to 1966

Medical Undergraduate

University of Alabama
Tuscaloosa, Alabama
Pre-Medical 1966 to 1967

Medical College of Alabama
Birmingham, Alabama, 1967 to 1971
M.D. 6/5/71
Superior Scholarship Award
National Medical Honor Society

Postgraduate

University of Alabama Graduate School
Birmingham, Alabama
Fellow in Physiology/Biophysics 1969 to 1971
Ph.D. Candidate in Physiology/Biophysics
(Proton Transport)

University of Alabama Graduate School
Birmingham, Alabama
Ph.D. in Biophysics 8/25/74

POSTGRADUATE TRAINING:

Harvard University
Peter Brent Brigham Hospital
Boston, Massachusetts
Internship/Residency in General Surgery
June 1971 to June 1974

Mayo Clinic
Rochester, Minnesota
General Surgery Fellowship
July 1974 to June 1977

USAF School of Aerospace Medicine
San Antonio, Texas
Primary Certification / Aerospace Medicine
Certification Date: 3/11/72

University of Utah
Salt Lake City, Utah
Fellow Thoracic Surgery
July 1977 to June 1979

BOARD CERTIFICATION:

American Board of Surgery
2/27/78 23285
American Board of Surgery
Recertified 10/23/87 #23285
American Board of Thoracic Surgery
5/23/80 3547
American Board of Thoracic Surgery
Recertified 11/15/88 #3547
American Board of Thoracic Surgery
Recertified 12/31/2000 #3547

ACADEMIC APPOINTMENTS:

Harvard University
Boston, Massachusetts
Clinical Instructor in Surgery
1972 to 1973

University of Alabama in Birmingham
Birmingham, Alabama
Instructor in Physiology and Biophysics
1969 to 1971, 1973 to 1974

Mayo Clinic
Rochester, Minnesota
Clinical Instructor in Surgery
1974 to 1976

Mayo Clinic
Rochester, Minnesota
Associate Surgical Staff
1976 to 1977

Louisiana State University
Shreveport, Louisiana
Clinical Assistant Professor of Surgery
1979 to 1980

Michigan State University
College of Medicine
Lansing, Michigan
Assistant Clinical Professor of Surgery
1981 to present

CURRENT MEDICAL LICENSURE: Michigan 12-02-81 44368

PAST MEDICAL LICENSURE:

Louisiana	5-10-79	4484R
Utah	7-1-77	5604
Minnesota	7-1-74	0138642
Massachusetts	4-18-73	35392
Alabama	6-28-73	6278

NATIONAL HONOR SOCIETY MEMBERSHIPS:

1970 **Alpha Omega Alpha**
(National Medical Honor Society)

1971 **Sigma Chi**
(National Research Honor Society)

SOCIETY MEMBERSHIPS

American Heart Association 1986 to present
Past President (1988)

Harvard Alumni 1973

Mayo Alumni Association 1977

UAB School of Medicine Alumni Association 1971

Rotary International 1980

American College of Chest Physicians,
Fellow, 1981 to present
Council on Critical Care, 1983 to present

American College of Surgery,
Fellow, 1983 to present

International College of Surgeons,
Fellow, 1982 to present
Vice-Regent (1984 to 1991)

American College of Cardiology,
Fellow, 1984 to present

Society of Thoracic Surgeons,
Member 1983 to present

American Medical Association,
Member 1979 to present

Michigan Society of Thoracic and C.V. Surgeons,
Member 1988 to present

Michigan State Medical Society 1982 to present

Michigan Society of Thoracic Surgeons 1983 to present

Bronson Methodist Hospital,
Director 1985-1995
Staff Member, 1981 to present

PUBLICATIONS

Can the Osmotic Theory Still Be Used to Explain Net Uphill Water Transport Occurring in the Resting Stomach Bathed with Isotonic HCL? Biophysical J. 9:A264, 1969.

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A Technique for Rapid Localization and Resection of Pharyngoesophageal (Zenkers) Diverticular Using Intraoperative Endoscopy. John Corey, M.D. and Charles F. Butler, M.D.: Paper Presented by Dr. John Corey; Department of Surgery Resident Research Forum; Michigan State University, March 16, 1988.

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"Can You Afford to Grow Old?" James W. Addicott and Charles F. Butler. Probus

Publishing Company, Chicago, IL., 1992.

Physioacoustic Therapy with Cardiac Surgery Patients, Music Vibration, Tony Wigram and Cheryl Dileo (Editors), Jeffrey Books, 538 Covered Bridge Rd., Cherry Hill, N.J. 08034, 1997

Physioacoustics: The Sound Treatment of Pain and Stress, Music Therapy For Stress And Pain Management: A Multi-Disciplinary Exploration, Ed. Brian Wilson, Institute presented as part of the Inaugural American Music Therapy Association Conference, Cleveland, 1998.

Physioacoustic Therapy With Post-Surgical and Critically Ill Patients, Music Therapy and Medicine: Theoretical and Clinical Applications, The American Music Therapy Association, Silver Spring, MD (1999).

The Curative Powers of Low Frequency Sound, Light and Sound 2000, Spectrum International, Chicago, IL, 2000

Physioacoustics, The Healing Power of The Drum pps.134-139, Robert Lawrence Friedman, White Cliffs Media, Reno, NV, 2000

RECENT RESEARCH PARTICIPATION:

Research Consultant, Upjohn Corporation, 1994.

Clinical Investigator, Hill-Rom Corporation, 1994.

Clinical Investigator, Next Wave Corporation, 1990-1994.
The Use of Physioacoustic Therapy Following Open Heart Surgery, Next Wave Corporation; Bronson Methodist Hospital; Kalamazoo, Michigan 1994.

The Use of Physioacoustic Chair Therapy in the Management of Postoperative Pain Control and Its Effect on Length of Hospital Stay. Sponsored by Bronson Methodist Hospital and Next Wave, Inc. Kalamazoo, Michigan 1990-1992 BMH 737.

Multicenter Controlled Study of Nifedipine. Sponsored by Pfizer Laboratories. Monroe, Louisiana 1980.

Multicenter Placebo Controlled Study of Iloprost in Cardiopulmonary Bypass. Sponsored by Berlex Laboratories, Inc. Kalamazoo, Michigan 1986-1987.

Extracorporeal Membrane Oxygenation: Use in Acute Cardiac and/or Pulmonary Failure. Kalamazoo, Michigan, 1987-1988.

Electrical Characteristics of Human Tissue in Normal and Disease States. (Laboratory Project).

Automated Potassium Replenishment in Postoperative Cardiac Patients.

Left Atrial Pressure as Related to Cardiac Output in Postoperative Aortic Valve Replacement.

Aorto-Innominate Venous Fistula Repair.

PROFESSIONAL COMMITTEES

American College of Chest Physicians Council on Critical Care	1983 to present
American Heart Association Council on Cardiovascular Surgery	1983 to 1984
International College of Surgeons Vice Regent	1984 to 1991
Cardiopulmonary Resuscitation Comm.	
Utilization Review Committee	1984
Cancer Protocol Committee	1985
American Heart Association Nominating Committee	1987

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Charles F. Butler

Serial No.:	10/039,303	Art Unit:	3764
Filed:	January 2, 2002	Examiner:	Justine Romang Yu
For:	SIMULATED WAVE MASSAGE		

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

RULE 132 DECLARATION

The undersigned in accordance with the following declaration says as follows:

1. Attached hereto is my Curriculum Vitae.

2. I am familiar with the work of Dr. Charles F. Butler, M.D. in the field of acoustical therapy and I have read his patent application identified by the serial number 10/039,303 which was filed in the U.S. Patent Office on January 2, 2002.

3. To the best of my acknowledge and belief Dr. Butler is the first to provide a method of applying acoustical vibrations to the human body in which a single transducer can be used for producing by way of a signal an acoustically induced vibration in the body and thereafter varying the frequency of the signal by a continuous or scanning movement to move the location of the vibration from one body part to another body part.

4. I have been provided and have reviewed U.S. Patent 5,101,810, in which at least two loud speakers or transducers are utilized with one speaker receiving a low frequency signal to produce a vibratory effect in a particular part of the body. The other speaker

accommodates music. A particular signal frequency is used for a specific body part for a specific length of time. While the frequency used in patent 5,101,810 can be varied, it is done so in discreet increments. This patent teaches or suggests the usage of a specific frequency for a specific body part for a specific length of time.

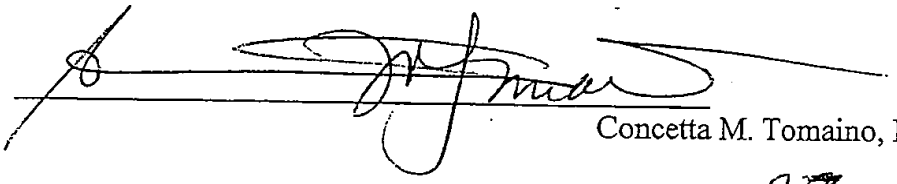
I have been provided a copy of U.S. Patent 5,113,852 and find that it is directed to what the inventor here calls is a common drawback problem in which subjecting a body part to a continuous vibration produces a numbing or muscle fatigue. The inventor here indicates in column 1, on line 57, that this problem of muscle fatigue exists whether utilizing a constant frequency or a varying frequency. Thus, it is readily apparent that the inventor of this patent, like other inventors and users in the field of acoustical therapy, did not realize that beneficial therapeutic results can exist by the use of varying frequencies. In this patent at least two transducers are needed. The vibratory effect is moved from one speaker to another by inducing a phase difference at the respective transducers. Even when the frequency is varied, such as illustrated in Figure 5, the movement of the vibration from one body part to another still requires multiple transducers to accommodate the phase difference in the signals.

In considering patents 5,101,810 and 5,113,852, neither patent suggests to me, as one having ordinary skill in the art that one can move the location of a vibration from one body part to another body part by using a minimum of one transducer and varying the frequency of the vibration causing signal by scanning. The inventor in patent 5,101,810 utilized discreet or separate signal frequencies without any continuous movement or scanning while the inventor in patent 5,113,852 utilized a phase off-set for the signal to

produce a wave-like vibration available only through multiple transducers.

7. In summary the invention of Dr. Charles F. Butler in actuating a wave generation device to cause a transducer to provide a signal producing vibration in the body and thereafter varying the frequency of the signal by scanning to move the location of the vibration from one body part to another with the minimum of one transducer is not obvious from the prior art as it is known to me.

I hereby declare that all statements made here are of my own knowledge are true and are all statements made on information and belief are believed to be true: and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 118 U.S.C. 1001.



Concetta M. Tomaino, DA, MT-BC

Date: May 27, 2003

CURRICULUM VITAE

CONCETTA M. TOMAINO, DA,MT-BC
66 Aqueduct Road
Garrison, New York 10524
845-737-3182

EDUCATION

5/98	New York University DA - Music Therapy
4/84	Columbia University Post graduate course in Neuropsychology
1979	New York University MA - Music Therapy
1976	SUNY at Stony Brook BA - Music Performance Minor - Psychology/Sciences

CERTIFICATIONS

1993	ACMT - The American Association for Music Therapy
1984	BC - The Certification Board for Music Therapy. Certificate #226
1980	CMT - The American Association for Music Therapy

ACADEMIC AFFILIATIONS

10/01 -Present	Berkley College of Music, Boston, MA:Fellow
1/95-Present	New York Geriatric Education Center Title: Faculty
9/01-Present	Brookdale Center For Aging: Title: Adjunct Faculty
9/79-Present	New York University Title: Clinical Music Therapy Internship Supervisor/Guest lecturer

9/83-Present	Molloy College Title: Adjunct Music Therapy Internship Supervisor
9/92-Present	New School for Social Research Title: Clinical Music Therapy Fieldwork Instructor
6/97-Present	Adler Institute Title: Guest Lecturer
7/87	The College of New Rochelle Title: Adjunct Faculty/Independent Study Instructor

PROFESSIONAL EXPERIENCE

8/00-Present	Beth Abraham Health Services Vice-President for Music Therapy Director, Institute for Music and Neurologic Function
1/94-7/00	Beth Abraham Hospital Title:Director of Music Therapy
3/80-12/93	Beth Abraham Hospital Title: Music Therapist -Research development programs on impact of music on memory and other neurologic functioning.
11/86-Present	Marrs/Treetops Nursing Home Title: Music Therapy Consultant
1988-Present	Private Music Therapy Practice Specializing in use of music therapy neurological diseases, especially Parkinson's and Alzheimer's disease.
6/91-5/93	Kittay House Title: Music Therapy Consultant
1/89-12/90	New York University Title: Assistant Research Scientist

-Assisted in grant writing. Designed and implemented research studies related to the bio-mechanical,physiological,and psychological aspects of performance in music and dance.

5/78-3/80 — Wartburg Home for the Aged
Title: Music Therapist

7/78-3/80 — Hebrew Home for the Aged
Title; Music Specialist

1/77-8/77 — YMHA Bergen County
Title: Music Specialist

PROFESSIONAL AFFILIATIONS

1/03 — Member Development Committee, American Music Therapy Association

1/98 - 2001 — Chair, Job Reanalysis Committee, Certification Board for Music Therapists

1/98 - 1/99 — Member,Futures Committee, American Music Therapy Association

9/97 - 2001 — Editorial Review Board: Journal of Music Therapy

9/97 - 2001 — New Media Review Editor: International Journal of Arts Medicine

3/97 - PRESENT — Super Panel member for GRAMMY in the Schools, National Academy of Recording Arts and Sciences

1/97 - 2001 — Certification Board For Music Therapists

10/95- PRESENT — Advisory Board of the Center for Alternative Medicine Research in Rehabiliation at the Kessler Institute for Rehabilitation, Inc.

9/93-PRESENT — Research Advisory Committee of the Institute for Music and Neurologic Function

	<u>International Journal of Arts Medicine</u>
1/91-Present	International Advisory Board member
	<u>American Association for Music Therapy</u>
9/92-8/93	Past-President
9/89-8/92	President
9/82-8/92	Member of the Executive Board
9/82-8/92	Member of the Board of Directors
9/88-8/89	President - Elect
9/83-8/88	Vice-President for Professional Standards
9/82-8/90	On-Site Observer for Alternate Route Certification
4/80-8/88	Member of the Certification Committee
9/82-8/83	Chairperson of the Certification Committee
	<u>Certification Board for Music Therapist</u>
11/92-6/94	Chair of the Job Re-analysis Committee
11/87-8/89	Member of the Continuing Education Committee.
	<u>National Coalition of Arts Therapy</u> Associations
9/88-8/93	Representative for AAMT
9/82-2000	New York Neuropsychology Group
9/79-Present	International Trumpet Guild
6/79-Present	American Federation of Musicians Locals 38 and 398
11/90-Present	National Association for Female Executives, Inc.
5/93-Present	PHI DELTA KAPPA

PERFORMANCE EXPERIENCE

7/76-Present	Free-Lance trumpet performer
11/85-Present	Solo/Principal trumpet-Lehman College Community Concert Band
6/91- Present	Section trumpet - White Plains Pops
6/89- Present	Section trumpet - Westchester Band
5/85-5/90	Section trumpet- Philharmonic Symphony of Westchester
7/79-5/80	Section trumpet-American Concert Band

SCHOLARSHIPS AND AWARDS

9/88-12/88	Doctoral Research Assistantship/Human Performance Analysis Laboratory-NYU
6/78-6/79	NYU Graduate Assistantship
9/78-6/79	N.E. Collins Scholarship
6/78	Kurtz Scholarship
9/72-6/76	Regents Scholarship

LISTING

1991-Present	WORLDS WHO'S WHO OF WOMEN

AWARDS

3/15/99	Touchstone Award - Women in Music

10/23/92	Music Therapists for Peace - Award for advancing public awarenesss of music therapy and for contribution to a more peaceful and harmonious world through methods unique to music therapy.

GRANTS

2002 $493,500	US Administration on Aging, HHS earmark grant PI
2000 $50,000	Wallerstein Foundation 5 year clinical grant PI
1999 25,000	New York State Congressional Grant PI
1997 $184,275	New York State Department of Health Co-PI
1995 $10,000	REX Foundation PI
1995 $6430	Haym Salomon Geriatric Foundation PI
1994 $234,000	New York State Department of Health. PI

PUBLICATIONS

Tomaino, C. (2002) The Role of Music in the Rehabilitation of Persons with Neurologic Diseases. Music Therapy Today (online), August, available at http://musictherapyworld.net

Tomaino, C. (2002, Winter). How Music Can Reach the Silenced Brain. Cerebrum. Vol 4:1, pp 22 – 33.

Tomaino, C. (2000)	Working with Images and Recollection with Elderly Patients. In, D. Aldridge (Ed.) Music Therapy in Dementia. London: Jessica Kingsley.
2000	Using Music Therapy with Persons with Parkinson's Disease. In Cote,

Sprinzeles, Elliot & Kutscher (Ed.) Parkinson's Disease and Quality Of Life. New York: Haworth Press.

1999 Tomaino, C., Scheiby, B., Asmussen, S.,Ramsey,D., Shah, V., &Goldstein, A. (1999)
The effects of a music therapy intervention on the levels of depression, anxiety/agitation, and quality of life experienced by individuals diagnosed with Early and middles stage dementias: A controlled study. Final Report to the 1996 Dementia Grants Projects, Office of Continuing Care, New York State Department of Health.

1999 Active Music Therapy approaches for Neurologically Impaired Patients. In Maranto (Ed.) Music Therapy and Medicine: Theoretical and Clinical Applications. 115-122. American Music Therapy Association, Inc.

1998 Tomaino (Ed.) Clinical Applications Of Music in Neurologic Rehabilitation. St. Louis.
MMB Music, Inc.

1998 Tomaino, C. M. (1998). Music and Memory. In Tomaino (Ed.) Clinical Applications Of Music in Neurologic Rehabilitation. St. Louis. MMB Music, Inc.

1998 Music on their minds: A Qualitative study of the effects of using familiar music to stimulate preserved memory function in persons with dementia. Unpublished Doctoral Dissertation. New York University: UMI.

1996 The Influence of Music on Memory in Patients with Dementia. (Final research findings NYDOH grant. unpublished).

1996 Music Therapy for the Elderly In Long Term Skilled Nursing Care and Short Term Rehabiliation" in Music Therapy International Report Volume 10, pp 69-71.

1993 Music and music therapy for the frail non-institutionalized elderly. Journal of Long Term Home Health Care: The PRIDE Institute Journal, 13,(2) 24-27.

1993 Music and the limbic system. In F.J. Bejjani (Ed.),Current Research in Arts Medicine. Illinois: A Cappella Books.

1991 "Music and Neurological Disorder" with Oliver W. Sacks, M.D. International Journal of Arts Medicine:Fall 1991 1:1 pp7-9 MMB Music.

1989 "Comparison of Three Piano Techniques as an Implementation of a Proposed Experimental Design" with F.J. Bejjani,M.D.,Ph.D. et al Medical Problems of Performing Artists.

CHAPTERS

1991 Xu, N.;Bejjani, F.J.;Titiloye,V.M.;Lei, L.;Tomaino, C.M.;and Lockett, R. "Conversion of forearm surface EMG into Force: Experimental design and pilot study." In: Anderson, P.A.,Hobart, D.J., and Danoff, J.V. (eds), Electromyographical kinesiology. Amsterdam, The Netherlands: Elsevier Science Publishers B.V. 1991.

1991 Titiloye, V.M.;Bejjani, F.J.; Xu, N.;and Tomaino,C.M."Upper extremity force requirements in violin vibrato: A dynamic electromyographic study." In: Anderson,P.A., Hobart, D. J., and Danoff, J.V. (eds), Electromyographical Kinesiology. Amsterdam,the Netherlands: Elsevier Science Publishers B.V. 1991.

1989 Bejjani, F.J.;Ferrara, Lu;Xu, N. Tomaino, C.M.;Pavlidis, L.; Wu, J.;Dommerholt, J. "Synchronized electromyographic, video and sound analysis of piano performance with comparison of three methods."In:

J.J.Presperin (ed), Technology of the Next Decade. Proceedings of the 12th Annual Resna conferences, Washington, D.C.: Resnapress, 1989, pp 258-259.

ABSTRACTS

2001 The Role of Music in the Rehabilitation of persons with Nueurologic Diseases: Gaining Access to "Lost Memory" and Preserved Function Through Music Therapy. P. 88 In Music Therapy In Europe: Napoli 2001 The 5th European Music Therapy Congress.

1997 " Music and Memory: Implications for Persons with Dmentia" p. 436. In Aging Beyond 2000: One World One Future. Book of Abstracts, World Congress of Gerontology, Adelaide Australia.

1992 "Medical Problems of the Elderly: Implications for Music Therapy Assessment and Intervention" Proceedings AAMT 21st Anniversary Conference.

1989 Lockett,R.;Bejjani, F.J.;Xu, N. Tomaino,C.M.; and Ruskin,A. "Three-dimensional analysis of cervical motion. Archives of Physical Medicine and Rehabilitation, 70(11), A-95, 1989.

1989 Bejjani, F.J.:and Tomaino,C.M. "Comparison of three piano methods using state-of-the-art motion analysis technology. Proceedings of the International Society for Music in Medicine. Palm Springs,CA, 1989.

1989 Bejjani,F.J.;Tomaino, C.M., and Ferrara, L.A."Comparative Acoustic and EMG analysis of Violin Vibrato. Proceedings of the 7th Conference on Medical Problems of Musicians and Dances, 1989.

1990 Xu, N.;Bejjani,F.J.;Titiloye, L.;Lei, L.; and Tomaino, C.M. "Conversion of forearm surface EMG into force - Experimental design and pilot study" Proceedings of the International

Society of Electrophysiological Kinesiology, 1990.

1990 Titoye, V.M.;Bejjani, F.J.;Xu,N.; Tomaino, C.M.;Lei, L. "Upper extremity force requirements in violin vibrato.A dynamic electomyographic study." Proceedings of the International Society of Electrophysiological Kinesiology, 1990.

CONFERENCE PRESENTATIONS:

Invited speaker to over 10 international conferences annually. subjects include topics related to "Music and Neurologic Function" Music Therapy and Integrative Medicine" Music Therapy and Rehabilitation", "Music and Memory," "Music Therapy in Dementia Care"

MEDIA COVERAGE:

Work has been featured in many international media venues including "48 Hours," "60 Minutes" "CBS Sunday Morning" "The Doctor is In." National Public Radio and cited in several popular books including: Don Campbell, The Mozart Effect, Olivers Sacks, Anthropologist on Mars, Mitchel Gaynor, Sounds of Healing